AU9474104

(12) PATENT ABRIDGMENT (11) Document No. AU-B-74104/94
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 659978

(54) Title
MOBILE CONTINUOUS MINING MACHINE

Ceased

International Patent Classification(s)
(51)[5] E21C 035/06 E02F 003/26 E21C 025/16 E21C 027/10
E21C 035/08

(21) Application No. : 74104/94 (22) Application Date : 20.09.94

(30) Priority Data

(31) Number (32) Date (33) Country
PK0197 17.05.90 AU AUSTRALIA

(43) Publication Date : 24.11.94

(44) Publication Date of Accepted Application : 01.06.95

(62) Related to Division(s) : 78688/91

(71) Applicant(s)
Z C MINES PTY LTD

(72) Inventor(s)
DAVID B. SUGDEN; JOHN TURNER; ROBERT JAMES BOYD; THOMAS MARTIN HARTMAN; GERALD L. DOLLINGER; JOHN GREGG MOORE

(74) Attorney or Agent
PIZZEY & COMPANY , GPO Box 1374, BRISBANE QLD 4001

(57) Claim

1. A method of controlling a mobile mining machine of the type having a cutting wheel rotatable about a horizontal axis by wheel drive means and traversable across a mining face in order to maximize its mined output, including selectively controlling the kerf depth and kerf spacing such that the kerf ratio of kerf depth to kerf spacing approaches the optimum value for the rock being cut by continuously monitoring a sensing mining machine parameter and altering one or more of cutter penetration depth, cutter penetration rate, cutting wheel speed, and cutter slew rate based on one or more of a predetermined optimum cutter penetration depth value, a predetermined optimum cutter penetration rate value, a predetermined optimum cutting wheel speed value and a predetermined optimum cutter slew rate value derived from said sensed mining machine parameter.

2. Apparatus for automatically controlling one or more of cutter penetration depth, cutter penetration rate, and the cutter slew rate of a mining machine which includes a rotatable cutterhead having cutters and a boom assembly causing slewing of the cutterhead and a plunge assembly

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causing plunging of the cutterhead relative to the mining machine, said apparatus including:

means for sensing a given mining machine parameter;

means for processing said mining machine parameter to derive one or more of an optimum cutter penetration depth value, an optimum cutter penetration rate value, and an optimum cutter slew rate value;

controlling means for controlling one or more of cutter penetration depth, cutter penetration rate, and cutter slew rate based on one or more of said optimum cutter penetration depth value, on, said optimum cutter penetration rate value and said optimum cutter slew rate value.

21. A method of controlling a mobile mining machine of the type having a cutting wheel rotatable about a horizontal axis by wheel drive means and traversable across a mining face by slewing means in order to maximise its mined output consistent with maintaining cutter wheel power near a desired limit, including selectively controlling the kerf depth and kerf pacing such that the kerf ratio of kerf depth to kerf spacing approaches a predetermined value for the rock being cut by continuously monitoring a measure of cutting power or force and altering the speed of the slewing means to vary the traversing speed and thus the kerf spacing and further including the monitoring of changes in rock properties transversely across a rock face by storing kerf-spacing information for a traverse of said cutting wheel and utilising said kerf-spacing information to control the kerf spacing during successive traverses.

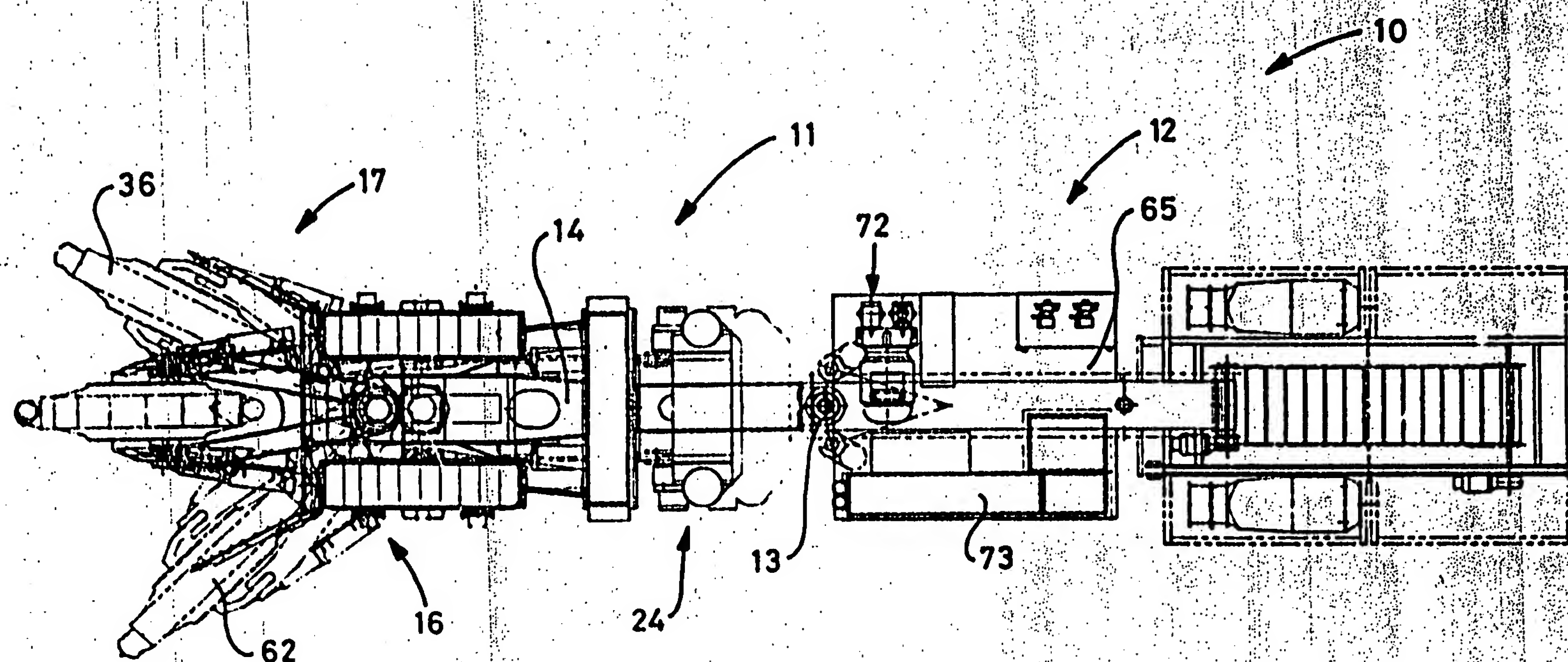

FIG. 2

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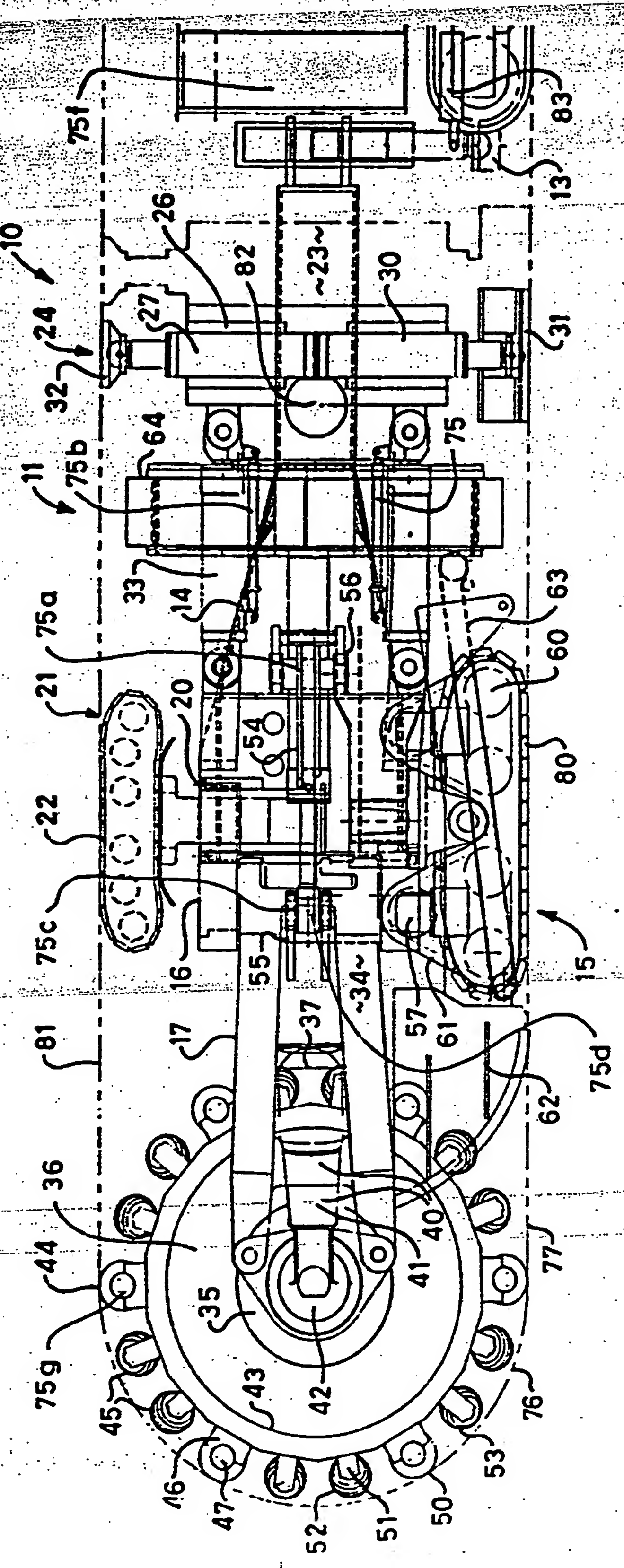


FIG. 3

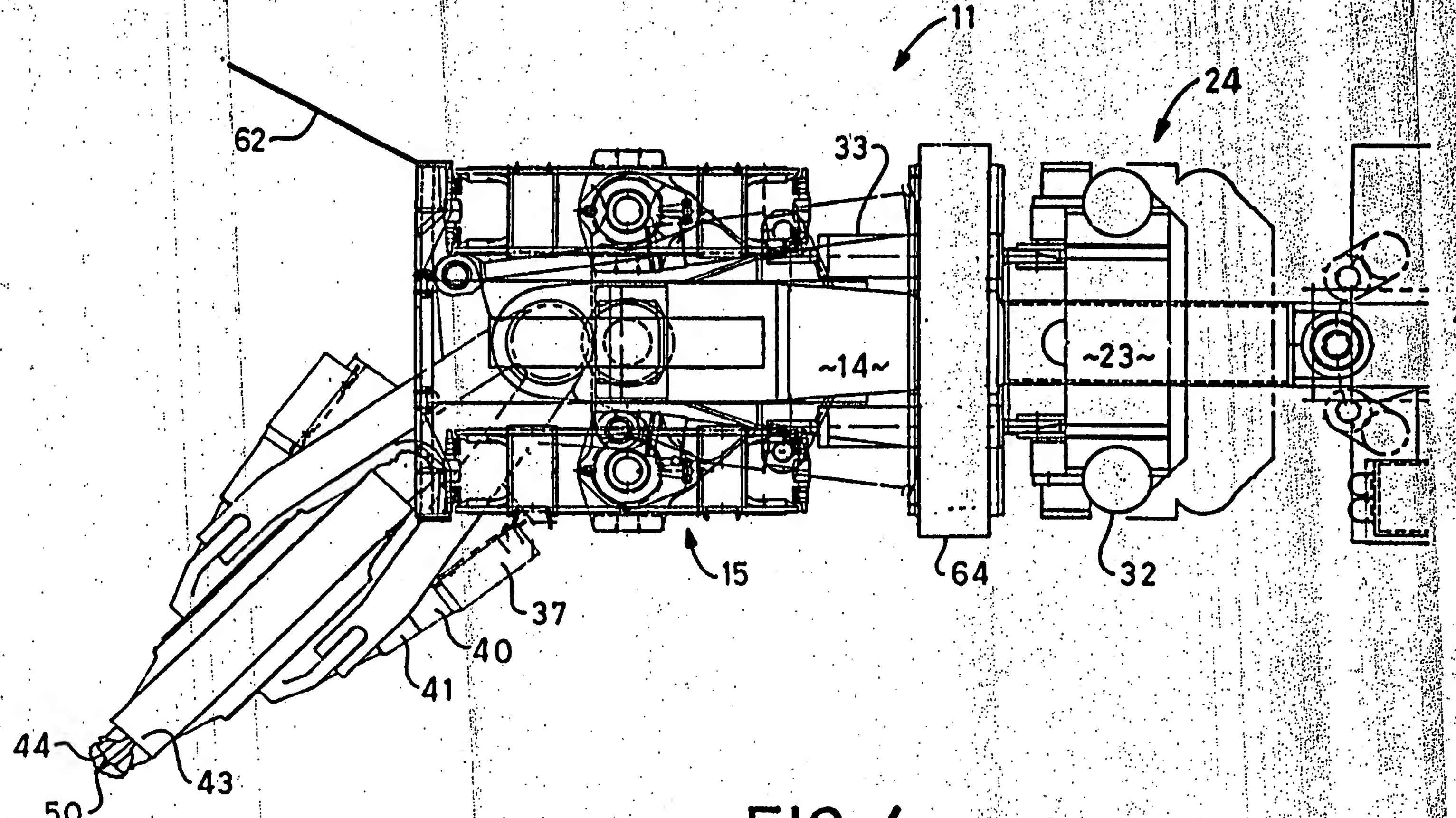


FIG. 4

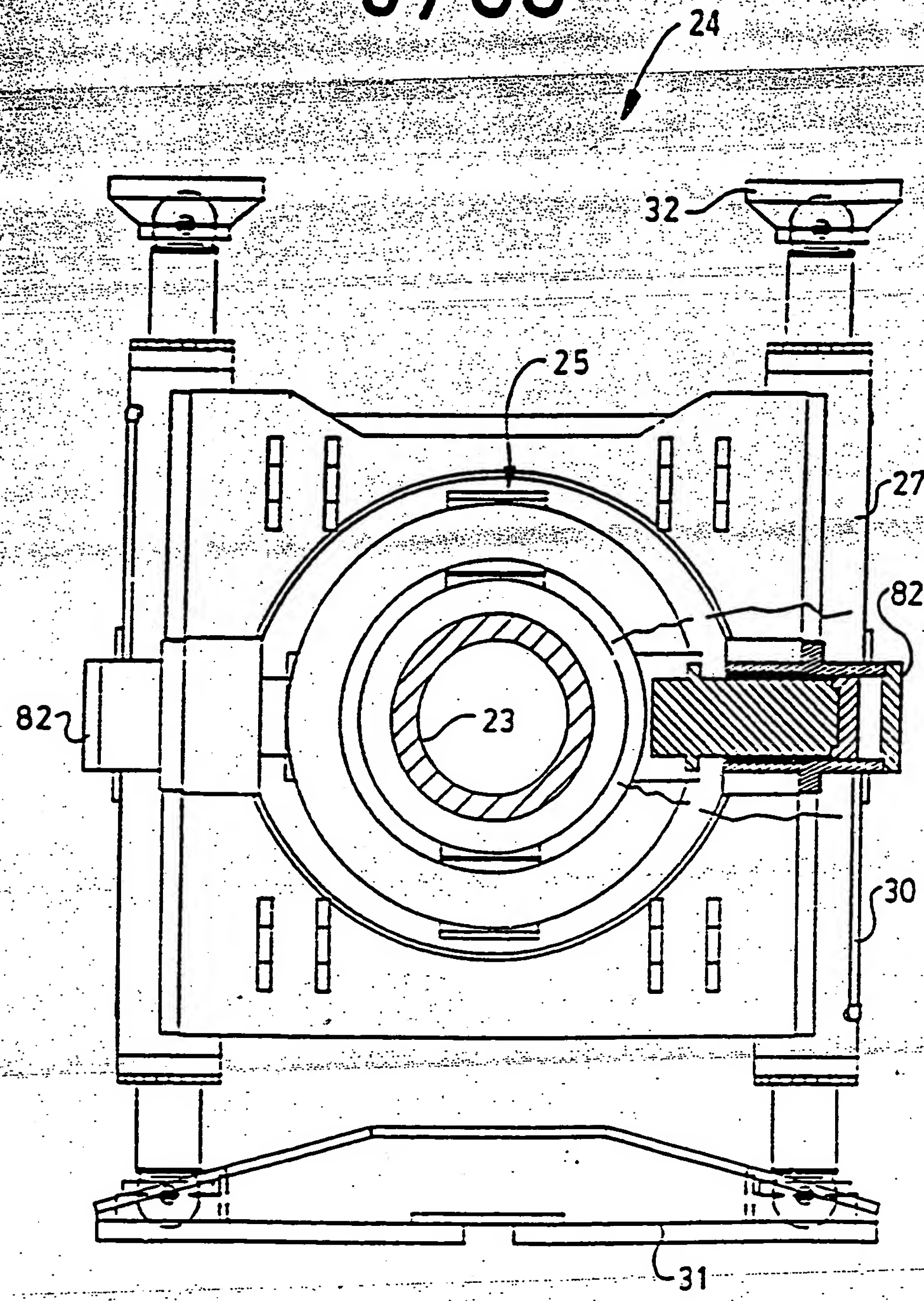
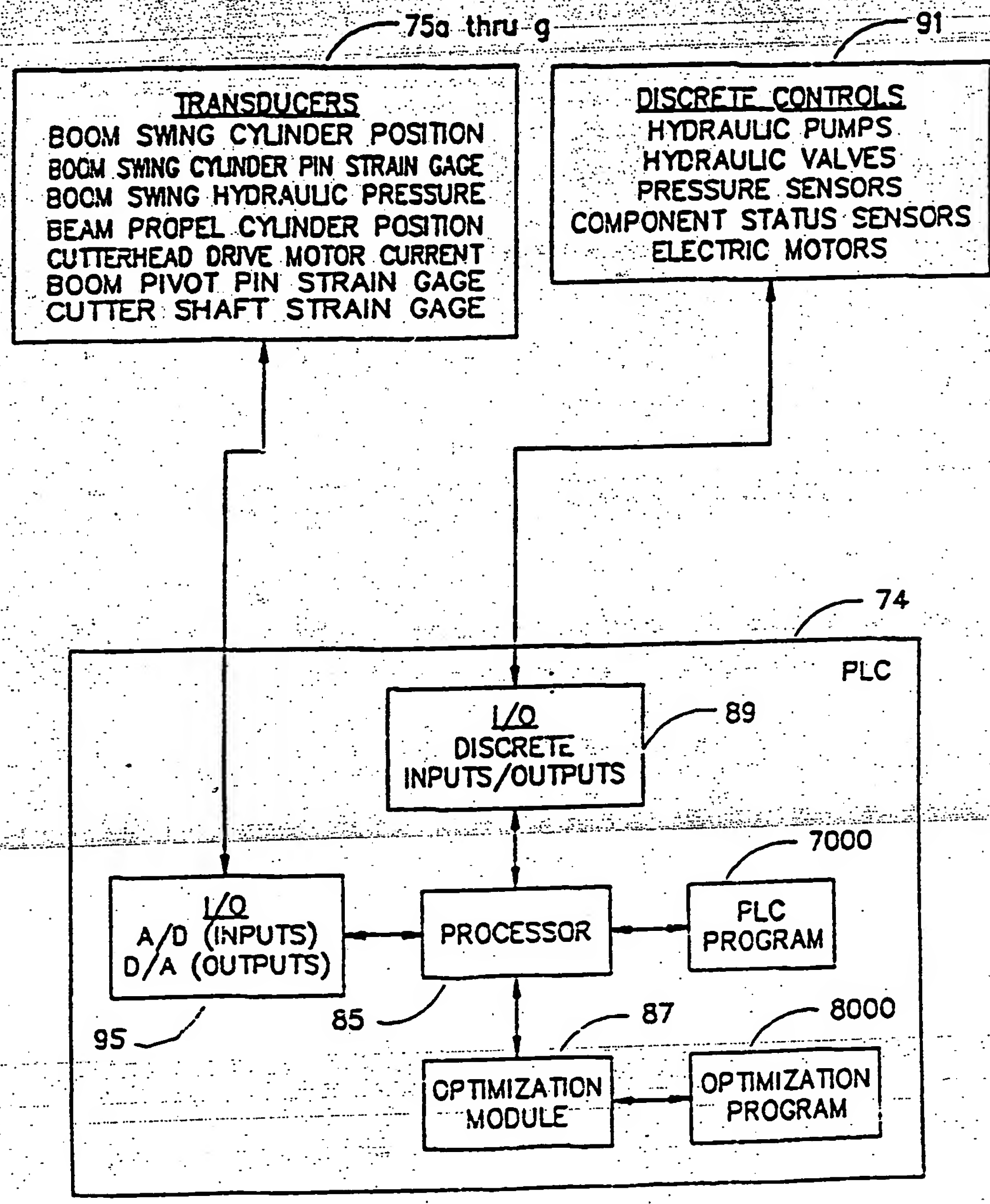


FIG. 5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91
TRANSDUCERS
BOOM SWING CYLINDER POSITION
BOOM SWING CYLINDER PIN STRAIN GAGE
BOOM SWING HYDRAULIC PRESSURE
BEAM PROPEL CYLINDER POSITION
CUTTERHEAD DRIVE MOTOR CURRENT
BOOM PIVOT PIN STRAIN GAGE
CUTTER SHAFT STRAIN GAGE
DISCRETE CONTROLS
HYDRAULIC PUMPS
HYDRAULIC VALVES
PRESSURE SENSORS
COMPONENT STATUS SENSORS
ELECTRIC MOTORS
74
PLC
I/O
DISCRETE
INPUTS/OUTPUTS
89
7000
I/O
A/D (INPUTS)
D/A (OUTPUTS)
PROCESSOR
PLC
PROGRAM
95
85
87
8000
OPTIMIZATION
MODULE
OPTIMIZATION
PROGRAM

FIG. 6

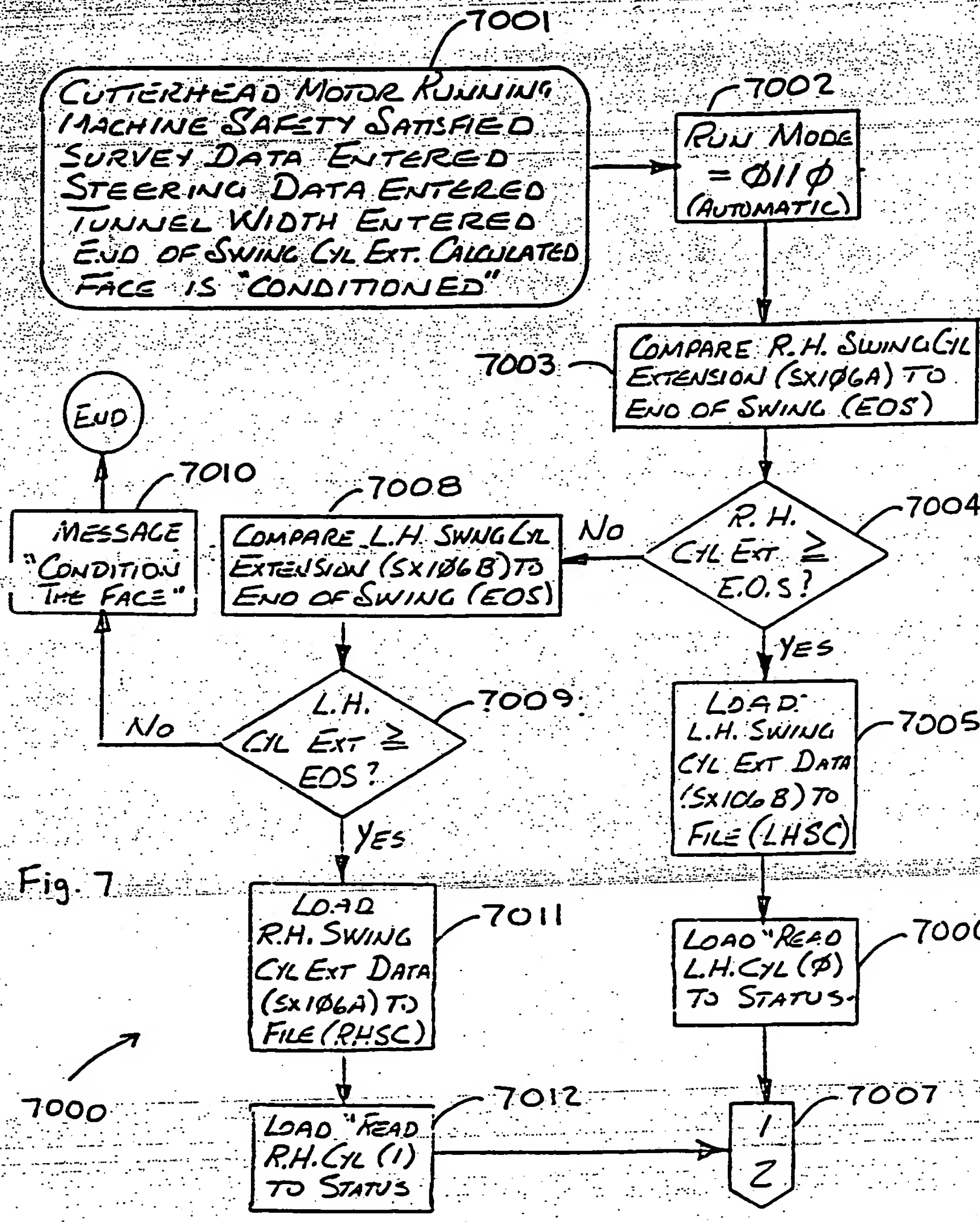
7001
CUTTERHEAD MOTOR RUNNING
MACHINE SAFETY SATISFIED
SURVEY DATA ENTERED
STEERING DATA ENTERED
TUNNEL WIDTH ENTERED
END OF SWING CYL EXT. CALCULATED
FACE IS "CONDITIONED"
7002
RUN MODE = Ø11Ø (AUTOMATIC)
7003
COMPARE R.H. SWING CYL EXTENSION (SX1Ø6A) TO END OF SWING (EOS)
7004
R.H. CYL EXT ≥ E.O.S?
NO
YES
7005
LOAD L.H. SWING CYL EXT DATA (SX106B) TO FILE (LHSC)
7006
LOAD "READ L.H. CYL (Ø) TO STATUS
7007
1
2
7008
COMPARE L.H. SWNG CYL EXTENSION (SX1Ø6B) TO END OF SWING (EOS)
7009
L.H. CYL EXT ≥ EOS?
NO
YES
7010
MESSAGE "CONDITION THE FACE"
END
7011
LOAD R.H. SWING CYL EXT DATA (SX1Ø6A) TO FILE (RHSC)
7012
LOAD "READ R.H. CYL (1) TO STATUS
7000

Fig. 7